PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 07 March 2001 (07.03.01)	
International application No. PCT/GB00/02832	**Applicant's or agent's file reference** P021555WO
International filing date (day/month/year) 21 July 2000 (21.07.00)	**Priority date** (day/month/year) 21 July 1999 (21.07.99)
Applicant NYBERG, Bernth, Lorentz et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

30 January 2001 (30.01.01)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Olivia TEFY
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

12

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
P021555WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB00/02832	21/07/2000	21/07/1999
International Patent Classification (IPC) or national classification and IPC B32B27/12		
Applicant DEXTER SPECIALITY MATERIALS, LTD. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
30/01/2001	02.01.2002
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer Derz, T Telephone No. +31 70 340 3159

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02832

I. Basis of th report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-3,5-7,9-11	as originally filed			
4,4a,8	as received on	20/08/2001	with letter of	16/08/2001

Claims, No.:

27,28	as originally filed			
1-26	as received on	20/08/2001	with letter of	16/08/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   ☐ the language of publication of the international application (under Rule 48.3(b)).
   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.
   ☐ filed together with the international application in computer readable form.
   ☐ furnished subsequently to this Authority in written form.
   ☐ furnished subsequently to this Authority in computer readable form.
   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:
   ☒ the claims, Nos.: 27, 28
   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-26
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-26
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-26
	No:	Claims	

2. Citations and explanations
   see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1) Reference is made to the following documents:
D1: WO-A-9729909 (cited in the application)
D2: EP-B1-0734321 (cited in the application)
D3: JP-A-2276636 (interpreted by its WPI/Derwent abstract AN-1990-380840)
D4: JP-A-55158961 (interpreted by its WPI/Derwent abstract AN-1981-10862D)
D5: JP-A-5131536 (interpreted by its WPI/Derwent abstract AN-1993-208571)
D6: US-A-4684568

2) Novelty

The present application does satisfy the criterion set forth in Article 33(2) PCT because the subject-matter of **Claims 1-26** is **novel** in respect of prior art as defined in the regulations (Rule 64(1)-(3) PCT).

Amended Claim 1 of the application defines a
-water vapour permeable/breathable substrate with a WVTR > 30 g/m^2/day
comprising an NWF comprising cellulose fibers coated with a
-water vapour permeable (thermo)plastic coating with **olefin (meth)acrylate (co)polymer**
-comprising a filler (CaCO2, TiO2...)
for the use as wallpaper or base in wallcovering.

Independent **process claim 19** comprises the process step of **applying a coating formulation as a coating layer onto a substrate** for obtaining a water vapour permeable laminate as defined above and having the characteristic feature that the **composite material is not stretched by more than 3 % in either machine or cross direction.**

None of above cited prior art disclose all features in common.
D1 and D2 are from the fields of sanitary items and in practice not usable as wallcovers, because the polyolefinic NWF would not adhere with conventional water-based adhesives in the field of wallcovers.

Furthermore D1, D2, D3, D5 and D6 all require **stretching** (at least 10 % up to 300 %) to render a filled thermoplastic coating water vapour permeable, whereas the claimed invention (cf. cl. 19) does not (a maximum of 3 %).
The essential technical features leading to this wished result of parameter defined WVTR are defined in claim 1 (the copolymer coating) and the cellulose fiber NWF (for adhesion), but they are not present in the listed prior art.

D1 defines in the claims and description (please cf. with the search report) an **extrusion-coated** (equal to present process claim 23) nonwoven fabric resulting in a permeable (D1, cl. 10), microporous laminate.

D2 defines a similar laminate which comprise extruding the filled polyolefin blend into a film (p.3, l.52-53), stretching it, and if a bonding agent is present in the polymer film (p.5, l.31-55) the laminate can be formed '*in line*' (cf. p.7, l.22). This defines an extrusion coating process. A breathable film (D2, cl. 11) is obtained by extruding a blend of 10-68 wt.% linear PO + 30-80 wt.% filler + bonding agent (EVA, EEA, EMA...), then stretching extruded film. Claimed are (i) the breathable film formed in the claimed process and (ii) a breathable film/non-woven laminate made by laminating a fibrous polyolefin non-woven web to the above film, film WVTR > 100 g/m2*24h.

D3 and D5 define similar laminates (used for **wallpapers**) whereby the process step called '**melt-laminating**' is equivalent to extrusion coating of the present application. Also here stretching takes place.

D4 uses the term *coating* for defining features of the process of obtaining a water vapour permeable fabric/filled rubber composition laminate used for outer wall coverings.

3) Inventive Step
The present application does satisfy the criterion set forth in Article 33(3) PCT.

D4, D5 and D6 are the only documents referring to a possible use in wall coverings

D6 the manufacture of a vapour-permeable waterproof fabric - by **coating** with PP (polypropylene) having MVTR properties (<= 25-40-50 g/m^2/day; cf. col.3, l. 34, ex. 1-2)

with ut mploying fill rs in the polymer coating **b for hot-press cal nd ring,** which in turn provides higher vapour permeability (>200g/m^2/day) , fabric mfg. process comprises coating base fabric (which could comprise wood or cotton fibers; D6, col 13, l. 13), continuous layer of PP of unit wt. 5-15 g/m^2 , and then hot-press calendering the coated surface to provide vapour permeability, specifically by forming small pores. Minimum vapour transmission is 200 g/m^2/day, but hydrostatic head of minimal 20 cm remains. **There is no dislosure of a coating of an olefin alkyl (meth) acrylate copolymer.** Because this feature is also missing in D4 and D5, it is not obvious with a combination of any of these documents to arrive at the claimed subject-matter.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
P021555WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/GB 00/ 02832	21/07/2000	21/07/1999
Applicant		
DEXTER SPECIALITY MATERIALS, LTD. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. _____

   [ ] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [X] None of the figures.

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/GB 00/02832

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B32B27/12 B32B27/20 B32B5/32 B32B31/00 D06N3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B32B D06N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	✓WO 97 29909 A (CLOPAY PLASTIC PROD CO) 21 August 1997 (1997-08-21) cited in the application page 7, line 2-18 -page 12, line 20; claims 1-6,8,10,11,13; figure 1; examples 1,2; table II page 14, line 15,16 -page 15, line 21 ---	1-3,5,6, 12-15, 17,18, 20-23, 27,28
X	✓EP 0 734 321 A (KIMBERLY CLARK CO) 2 October 1996 (1996-10-02) page 3, line 53 page 5, line 53-55 -page 7, line 22; claims 1,3-6,15 --- -/--	1,2,5, 12-15, 17,18, 20-23, 27,28

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 August 2000	07/09/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Derz, T

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/02832

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 187 005 A (STAHLE ARNO W ET AL) 16 February 1993 (1993-02-16)	1,2,5, 8-10,15, 21-28
Y	claims 1-5,11-18	7,17,18
X	DATABASE WPI Section Ch, Week 198107 Derwent Publications Ltd., London, GB; Class A32, AN 1981-10862D XP002125658 & JP 55 158961 A (UBE IND LTD), 10 December 1980 (1980-12-10)	1,2,5,6, 17
X	abstract	20-24
Y		3,4,6, 12-14, 16,22,23
X		27,28
X	DATABASE WPI Section Ch, Week 199326 Derwent Publications Ltd., London, GB; Class A13, AN 1993-208571 XP002125659 & JP 05 131536 A (SUMITOMO CHEM CO LTD), 28 May 1993 (1993-05-28) abstract	1,2,5, 17, 20-23, 27,28
X	US 4 878 974 A (KAGAWA SEIJI) 7 November 1989 (1989-11-07) claims 1-3,7-9	1,2,5, 21,27
Y	US 4 684 568 A (LOU GENE W) 4 August 1987 (1987-08-04) claims 1-4	1,2,5,7, 12-14, 21-23
Y	US 4 877 679 A (LEATHERMAN DENNIS D ET AL) 31 October 1989 (1989-10-31)	1-6, 16-18,21
X	column 2-4 -column 9-14; claims 1-9,25; example 35	27,28
A		7,12

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

I RNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/GB 00/02832

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9729909 A	21-08-1997	US 5865926 A	02-02-1999
		AU 710947 B	30-09-1999
		AU 2263897 A	02-09-1997
		BR 9707449 A	20-07-1999
		CA 2244861 A	21-08-1997
		CN 1211213 A	17-03-1999
		CZ 9802449 A	12-05-1999
		EP 0934161 A	11-08-1999
		HU 9902044 A	29-11-1999
		JP 2000504644 T	18-04-2000
		NO 983670 A	14-10-1998
		NZ 331190 A	25-02-1999
		PL 328565 A	01-02-1999
EP 0734321 A	02-10-1996	AU 687967 B	05-03-1998
		AU 1335395 A	03-07-1995
		BR 9408329 A	19-08-1997
		DE 69417258 D	22-04-1999
		DE 69417258 T	08-07-1999
		JP 9506656 T	30-06-1997
		PL 315183 A	14-10-1996
		RU 2140855 C	10-11-1999
		CA 2116081 A	18-06-1995
		CN 1142798 A	12-02-1997
		EG 20760 A	31-01-2000
		ES 2131800 T	01-08-1999
		FR 2713983 A	23-06-1995
		FR 2717737 A	29-09-1995
		GB 2285408 A,B	12-07-1995
		WO 9516562 A	22-06-1995
		US 5855999 A	05-01-1999
		US 5695868 A	09-12-1997
		ZA 9410026 A	22-08-1995
US 5187005 A	16-02-1993	NONE	
JP 55158961 A	10-12-1980	JP 1253908 C	12-03-1985
		JP 59030545 B	27-07-1984
JP 5131536 A	28-05-1993	NONE	
US 4878974 A	07-11-1989	JP 1201340 A	14-08-1989
		JP 8032790 B	29-03-1996
		JP 2059331 A	28-02-1990
		JP 2574171 B	22-01-1997
		JP 2080231 A	20-03-1990
		JP 2597895 B	09-04-1997
		CA 1290235 A	08-10-1991
		EP 0327402 A	09-08-1989
US 4684568 A	04-08-1987	AU 586387 B	06-07-1989
		AU 7179887 A	22-10-1987
		CA 1255978 A	20-06-1989
		EP 0246748 A	25-11-1987
		JP 62256652 A	09-11-1987
		NO 871615 A	22-10-1987
US 4877679 A	31-10-1989	NONE	

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
25 January 2001 (25.01.2001)

PCT

(10) International Publication Number
WO 01/05588 A1

(51) International Patent Classification[7]: B32B 27/12, 27/20, 5/32, 31/00, D06N 3/00

(21) International Application Number: PCT/GB00/02832

(22) International Filing Date: 21 July 2000 (21.07.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
99305768.6 21 July 1999 (21.07.1999) EP

(71) Applicant *(for all designated States except US)*: **DEXTER SPECIALITY MATERIALS, LTD.** [GB/GB]; Erskine House, 68-72 Queen Street, Edinburgh EH2 4NP (GB).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **NYBERG, Bernth, Lorentz** [SE/GB]; 70 Comiston Road, 1 FL, Edinburgh EH10 5QQ (GB). **PERSSON, Bengt, Johan** [SE/SE]; Grönegatan 28, S-222 24 Lund (SE).

(74) Agents: **DE MINVIELLE-DEVAUX, Ian, Benedict, Peter et al.**; Carpmaels & Ransford, 43 Bloomsbury Square, London WC1A 2RA (GB).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/05588 A1

(54) Title: POLYMER COATED WEB WITH GOOD WATER VAPOUR PERMEABILITY

(57) Abstract: A composite material which is suitable as a wall covering comprises a substrate layer that is permeable to water vapour, such as a nonwoven web material made from woodpulp and polyesters fibres, and that is coated, preferably extrusion coated, with a layer comprising an olefin polymer, olefin copolymer or blend of olefin (co)polymer and a particulate filler, e.g. calcium carbonate or a mixture thereof with titanium dioxide. The coating layer is also permeable to water vapour. A preferred olefin copolymer is an ethylene n-butyl acrylate copolymer.

POLYMER COATED WEB WITH GOOD WATER VAPOUR PERMEABILITY

Field of the invention.

The present invention relates to a composite material, especially a laminate material, that comprises a substrate layer and a coating layer that comprises a plastics material. The invention relates, especially to such a composite material that is permeable to water vapour and can be used as or in a wall covering.

Background to the invention.

Many uses exist for water-vapour-permeable composite materials which have a degree of water resistance. Typical applications include diaper cover sheets, 'breathable' clothing, wrapping for prefabricated building components, wallcoverings and medical drapes and gowns. Many constructions of such composites have been proposed, usually comprising a paper, nonwoven or textile substrate which is coated with a polymeric film that has been processed to enable that film to be water-vapour permeable. One method is to form the film, then perforate it and laminate it to the substrate web; this is a complex process involving several steps. US-A-5 089 075 (Sonada), however, describes a extrusion laminating process in which the cooling roll has a modified surface that perforates the film.

Other methods employ means for providing discontinuities in the polymeric film so that if the film is stretched then pores are created. Typically, the discontinuities are created by incorporating mineral fillers into the polymeric composition before film forming. A method of forming such films is described in EP-A-0 605 831 (Yamamoto et al, assigned to Mitsubishi Petrochemical Co. Ltd.). Also, WO-A-97/29909 (Wu et al, assigned to Clopay Plastic Products Co., Inc.) describes a process in which a thermoplastic film containing pore forming fillers is extrusion coated onto a nonwoven and then stretched. These methods all require the film or composite to be stretched (various other methods of carrying out the stretching can be found in the prior art) after coating, creating an extra stage in the process.

US-A-5 262 444 (Rusincovitch et al) describes a method for the production of a wall covering in which a low boiling point additive (e.g. water) is added to a plastisol comprising a curable plastic and a plasticiser before extrusion of the plastisol onto a substrate, e.g. paper. The resultant coating is then cured under conditions such that the low- boiling point additive vaporizes and creates voids in the film.

In GB-A-2 271 519 (Kano, assigned to Toyokasei Co. Ltd.) there is described a means of creating a permeable layer in a composite product. In this case particulate

materials are incorporated into a polymeric resin which is applied to a nonwoven using an automatic spray gun or painting robot. This process produces a relatively thick coating, is relatively slow and the use of spray application methods will often result in an uneven coating.

EP-B-734,321 (Kimberly-Clark Worldwide Inc.) discloses a laminate that comprises a film formed from a blend containing, on a dry weight basis relative to the total weight of the film, from 10 to 68% of a predominantly linear polyolefin polymer, for example a linear low-density polyethylene; from 30 to 80% of a filler, for example calcium carbonate, generally having an average particle size of from 0.1 to 7 μm; and from 2 to 20% of a bonding or tackifying agent, which may be selected, for example, from various hydrogenated hydrocarbon resins, petroleum hydrocarbon resins, polyterpene resins, ethylene-propylene rubber (EPR) and olefinic thermoplastic polymers in which EPR is dispersed in polypropylene or a polypropylene/polyethylene blend. Once the film has been formed, it is stretched in order to render it porous and breathable; in particular, the film should have a water vapour transmission rate of at least 100 $g/m^2/24$ h. The stretched film is then bonded to a fibrous polyolefin nonwoven web, for example a spun bonded polypropylene web. The bonding of the film to the web may be effected by thermal bonding, in particular by using heat and pressure as with heated, patterned bonding rolls or using ultrasonic bonding means. It is suggested that the bonding agent can alternatively be added to the fibrous nonwoven web. The laminate may find use as a replacement for plastic films used as backing sheets in such absorbent products as diapers.

WO-A-98/02609 (Kimberly-Clark Worldwide Inc.) discloses a reinforced film comprising a film layer that is oriented in a direction of stretching and that has an effective gauge of 0.6 mil (15.24 μm) or less. The film layer is formed from a blend including, on a weight basis relative to the total weight of the film layer, from 30 to 70% of a polyolefin polymer, from 70% to 30% of a filler and, optionally, up to 20% of a second polyolefin polymer, the film layer having a water vapour transmission rate of at least 300 $g/m^2/24$ h. A pattern of adhesive areas is applied to a surface of the film layer, these adhesive areas having an add-on amount of from 0.1 to 20 g/m^2, a percentage bond area of from 5% to 50% per unit area of said surface, and a maximum spacing between adhesive areas, in a direction generally parallel to the said direction of stretching, of 1 inch (25.4 mm) or less. A suitable polyolefin polymer is linear low-density polyethylene. A suitable filler is calcium carbonate, which may be coated with stearic acid. The adhesive may, for example,

be a conventional hot melt adhesive, pressure sensitive adhesive or reactive adhesive; block copolymer-type construction adhesives, ethylene vinyl acetate-based adhesives and amorphous alpha-olefin copolymer and terpolymer-based adhesives are mentioned. Although the primary function of the pattern of adhesive areas is to reinforce the film layer, the adhesive can be selected so that it remains tacky for a sufficient period of time to allow it to bond the surface of the film layer to a surface of an adjacent layer such as a nonwoven web or fabric. The film may find use as an outer cover in personal care absorbent articles such as diapers.

A commonly used type of wallcovering is the so-called 'vinyl' wallpaper which is normally a polyvinyl chloride (PVC) plastisol coated paper. Though this material can be used for a wide range of wallcovering applications, it is particularly used in areas where good durability and washability are required in both residential and commercial applications. However, the use of PVC does create some problems: in the coating and subsequent printing process it is necessary to have emission control equipment and the wallcovering itself is not flame retardent and emits hydrochloric acid and dense smoke when exposed to flame. When based on paper, the wall covering is not particularly dimensionally stable nor is it strippable when redecoration is carried out.

In the wallcover market, concerns have also been expressed regarding the impact of the use of PVC on the environment and on health, motivating the search for alternative materials.

It could be imagined that other polymer coatings might overcome these problems but such coatings have a major disadvantage themselves; they have a very low water vapour permeability (WVP), which may be measured as the water vapour transmission rate (WVTR). Thus, when the wallcover is hung using water-based adhesives, which is the common method, the wallcovering is very slow to dry and is subsequently prone to mould growth.

Summary of the invention.

The present invention, in one of its aspects, now provides a composite material comprising a substrate layer and a coating layer, characterised in that the coating layer comprises a plastics material, which plastics material is selected from olefin polymers, olefin copolymers, blends of olefin (co)polymers and mixtures of two or more of these, the said plastics material having particles of filler therein. In general, the composite material is permeable to water vapour. In general, the said substrate layer and the said coating layer

are each permeable to water vapour. In certain embodiments no further layer is included; however, in other embodiments, any additional layer will generally also be permeable to water vapour.

The present invention, in another aspect, also provides a process for the production of a composite material, which process comprises applying a coating formulation as a coating layer on a substrate layer, the coating layer and substrate layer being permeable to water vapour, wherein the coating formulation comprises a plastics material that is selected from olefin polymers, olefin copolymers, blends of olefin (co)polymers and mixtures of two or more thereof and has particles of filler therein.

The present invention, in yet another aspect, also provides a coating formulation that comprises a plastics material that is selected from olefin polymers, olefin copolymers, blends of olefin (co)polymers and mixtures of two or more thereof and that has particles of filler therein. The coating formulation may, of course, contain one or more other components: in certain preferred embodiments, however, it consists essentially of the plastics material and the filler. The filler may be a single material or a mixture of different materials.

In further aspects, the present invention also provides the use of the said composite material as a wall covering. Thus, the invention provides the said composite material for use as a wall cover material and also provides a method of covering a wall surface that comprises applying to it a composite material of this invention.

Description of exemplary embodiments of the invention.

When the substrate of the composite is a nonwoven, it is preferably wetlaid. Nonwovens used as the substrates will generally comprise natural, in particular cellulose, fibres and/or synthetic fibres, the latter expression including fibres of organic polymers or copolymers such as polyesters. Thus, the nonwovens can comprise woodpulp fibres, preferably both softwood and hardwood pulp fibres, and short cut polyester fibres. Additionally a filler, especially calcium carbonate, is preferably incorporated in the web to provide high opacity. The nonwoven can be bonded with a resin binder formulation, especially an acrylic or vinyl acetate resin formulation. The fibre length and linear density of the polyester fibres should be chosen to give good web uniformity and will, typically, be in the range 5 to 20 mm and 1.0 to 6.0 denier (9 to 54 tex) respectively. The woodpulps should be chosen to provide a good combination of strength, opacity and coating performance; their choice should preferably also recognise current environmental concerns.

Typical formulations for the nonwoven are 20 to 40% pulp (preferably 10 to 20% softwood pulp, 10 to 20% hardwood pulp), 10 to 20% synthetic (preferably polyester) fibre, 25 to 35% calcium carbonate, the percentages being by weight of the nonwoven on a dry weight basis, the remainder preferably comprising a binder. The binder should preferably be applied though a spray application or size press and preferably at a level to give between 15 to 20% solids in the finished substrate. The grammage (basis weight) of the substrate is preferably in the range 30 to 200 g/m^2. The substrate will, in certain preferred embodiments, have a thickness of from 40 to 500 μm, more preferably at least 80 μm, for example up to 300 μm.

Other substrates include papers, e.g. papers that are conventionally used as wallcovering substrates, and spunbonded, SMS and hydroentangled nonwovens. ("SMS" is a conventional acronym for a nonwoven composite comprising layers of spunbonded (S), melt blown (M) and spunbonded (S) webs.) Paper substrates may be exemplified by "Cresta Print M" and "Cresta Print F1" from Metsä-Serla Paperboard. ("Cresta" is understood to be a registered trade mark.)

The plastics material (which expression herein includes synthetic resins and synthetic polymeric materials) is preferably a polymer or copolymer of a C_2-C_4 olefin, especially of ethylene or propylene, or a blend comprising such a polymer or copolymer. Suitable co-monomers are C_1-C_4 alkyl acrylates or C_1-C_4 alkyl methacrylates. A particularly preferred plastics material is a copolymer of ethylene and n-butyl acrylate; such copolymers are described by L.K. Johnson, "Ethylene n-Butyl Acrylate Copolymers for Extrusion Coating and Lamination Applications", *Polymers, Lamination and Coatings*, a TAPPI PRESS Anthology of Published Papers, 1986-1991, pages 248-252.

Preferably, the plastics material has a water vapour transmission rate of at least 14 g/m^2 per 24 h at 25°C/75% RH (relative humidity) as measured on the unfilled plastics material at a mass per unit area of 45 g/m^2. The composite comprising the substrate layer and the coating of filled plastics material preferably has a water vapour transmission rate of at least 30 g/m^2 per 24 h at 25°C/75% RH.

The particulate filler distributed or dispersed (preferably uniformly distributed or dispersed) in the plastics material is preferably a mineral or inorganic filler, especially calcium carbonate and/or titanium dioxide. Other mineral fillers may come into consideration, e.g. talc, kaolinite, alumina trihydrate, feldspar or silica. Typical particle sizes of the fillers are in the range of from 0.1 to 10 μm, e.g. from 0.5 to 7 μm.

In general, the amount of particulate filler will be 40% or less, relative to the weight of filled plastics material: preferably the amount of filler will be 35% or less, more preferably 30% or less. In general, the mineral filler will be used in an amount effective to achieve a good water vapour permeability. Usually, the amount of mineral filler in the filled plastics material will be 2% or more, preferably at least 5%, more preferably 10% or more and most preferably at least 20% by weight.

Typical formulations for the plastics material are mixtures or alloys of an ethylene butyl acrylate copolymer (EBA) comprising 60 to 70% EBA, 20 to 30% calcium carbonate and 5 to 10% titanium dioxide, percentages being by weight of the mixture or alloy. Typically the basis weight (grammage) of the polymer layer is from 5 to 50 g/m^2, preferably from 10 to 50 g/m^2.

The plastics material can be applied to the substrate by any appropriate coating method. Extrusion is the preferred method, for example conventional flat die extrusion. Extrusion coating techniques are well known: see for example, Modern Plastics Encyclopaedia 1980-1981, McGraw-Hill Inc. pp 253-256. Moreover, other methods, such as knife coating, roll coating or transfer coating may come into consideration.

In certain preferred embodiments the coating layer will have a thickness of from 10 to 50 μm, e.g. from 25 to 50 μm.

A preferred embodiment of the invention comprises a wetlaid nonwoven web formed from woodpulp and polyester fibres into which is incorporated calcium carbonate bonded with resin. This nonwoven web is then extrusion coated with a polymer layer consisting of ethylene butyl acrylate, calcium carbonate and titanium dioxide.

In a particular application of the invention, a composite nonwoven is used as a base for a wallcovering which can be embossed and/or printed to give the required decorative effects. A nonwoven web, extrusion coated with a polymer, copolymer or polymer alloy, according to the invention will have many advantages over the prior art and overcomes a major problem with many other extrusion coated materials in that the material of the invention is permeable to moisture vapour so that drying of the hung wallcovering is not impeded.

The advantages of the composite nonwoven compared with the prior art, particularly the polyvinyl chloride coated papers, are that:

the composite nonwoven is fast drying and, because it is breathable, mould growth is eliminated;

since the composite is PVC free, there is no need for emission control equipment to be installed at the extrusion coating process nor in the subsequent printing processes; it is also odourless in use;

the composite has a smooth surface so that it has good rotogravure printability; it is also hot or cold embossable;

the coating layer can be applied in a thickness conventionally accepted in the wall cover art, that is to say excessively thick layers are not required;

adequate permeability may be achieved without the need for the addition of special low-boiling point additives, such as water or blowing agents;

the composite is flame retardent and there is no smoke release on burning;

the composite is dimensionally stable so that there is no seam separation and paper-based complexes are more dimensionally stable than those of the prior art;

hanging of the wallcover is facilitated by the good lay-flat properties, ease of cutting and strippability;

following the extrusion step and, if required, a curing step, there is no need for an additional processing step; in particular there is no need for a special stretching step in order to achieve the requisite permeability to water vapour. In certain preferred embodiments the composite material during its manufacture is not subjected to any substantial stretching, in either the machine direction (MD) or the cross direction (CD). Thus, in each of said directions, the composite material will normally be stretched by not more than 3 percent, preferably by not more than 2 percent, more preferably by not more than 1 percent, and most preferably there is essentially no stretching. Accordingly, the manufacturing equipment will generally be run at zero MD stretch and with no applied CD stretch. It is not precluded that in certain embodiments some shrinkage might occur in at least one direction.

The composite or laminate materials of the present invention will also come into consideration for other uses, for example in medical drape and gown materials.

Test methods.

Grammage: ISO 536

Appearance: A visual assessment against standard samples;

1 = unacceptable

2 = accepted with major remarks.

3 = accepted with minor remarks.

4 = totally acceptable.

Curl: Measured in mm. deviation from a flat surface after making an X-cut with the arms of the X being 160 mm long and at 45° to the machine direction.

Pinholes: Bendtsen porosity measured according to ISO 8971-4 after the sample is treated at 150°C for one minute. If there is zero porosity "OK" is reported.

Water vapour transmission rate (WVTR), measured according to DIN 53122, expressed as g/m^2 per 24hrs at 25°C and 75% RH.

Opacity: Elrepho %, measured according to SCAN P-3: 75.

Fire rating and smoke intensity: SIS 02 48 23.

Nicotine stain: degree of yellowing when subject to tobacco smoke expressed as the % increase in the b value of the L a b colour measurements.

Dimensional stability: the % increase in length in the cross direction after 10 minutes of a 100 mm square sample pasted to a plaster board surface.

Strippability: the % of the sample remaining on a plaster board substrate after an attempt to pull the sample off 14 days after it had been pasted to the substrate.

Examples.

The invention is illustrated by means of the following examples, in which reference is made to the above test methods.

Example 1.

A 70 g/m^2 nonwoven substrate comprising a fibre blend of 40% 1.7 denier (15.3 tex), 15 mm precision cut polyester fibre and 60% woodpulp bonded with a vinyl acetate resin binder such that the total fibre content was 80% and the binder content was 20%, was extrusion coated with 40 g/m^2 of a polymer alloy comprising 70% ethylene n-butyl acrylate copolymer (EBA) (Borealis grade 6417), 25% calcium carbonate (particle size 2 - 5 microns) and 5% titanium dioxide (particle size 2 - 5 microns). For the extrusion, the melt temperature was in the range 280 - 300°C and the length to diameter ratio for the screw was greater than 26.The test data are shown in Table 1.

Example 2.

This example is the same as Example 1 except that the extrusion coating was 30 g/m^2. The test data are again shown in Table 1.

Example 3.

The same substrate as in Example 1 was extrusion coated with 40 g/m^2 of a polymer alloy comprising 60% EBA, 30% calcium carbonate and 10% titanium dioxide. This

particular polymer alloy gave very inferior extrusion performance, probably because the filler content was too high. Test measurements were not made.

Table 1

Property	Example 1	Example 2
Grammage (g/m^2)	111	101
Delamination	No separation	No separation
Appearance	3	3
Curl MD	2-3	2-3
Curl CD	0	0
WVTR (g/m^2 per 24 hrs)	~50	~50
Elrepho opacity (%)	76.7	75.5

The test data demonstrate that materials made by the methods of Examples 1 and 2 provide good WVTR and can be produced with no difficulty using conventional extrusion coating processes. The opacity results were less than is normally required for wallcover applications so for this end use a substrate containing filler will commonly be required. An example with such a substrate is provided in Example 5.

Example 4.

Because the polymer compositions in Examples 1 and 2, based on EBA, gave such good results, evaluations of other polymers were carried out. In these cases the polymer blend contained no fillers and a 145 g/m^2 nonwoven substrate was used. (Though the grammage of the substrate was much higher than in the previous examples, it was very porous and would not have affected the WVTR results significantly.)

The extrusion coating coat weight was 45 g/m^2 and the polymers tested were:

Example 4a EBA (standard)

Example 4b Ethylene methyl acrylate (EMA)

Example 4c Low density polyethylene (LDPE)

Test data are included in Table 2.

Table 2

Property	Example 4a	Example 4b	Example 4c
Delamination	No separation	No separation	No separation
Appearance	4	4	4
Pinholes	OK	OK	OK
Water test	OK	OK	OK
WVTR (g/m^2 per 24 hrs)	14.2	8.8	1.9

This series of comparative tests of different polymers shows that EBA is to be preferred for high WVP. Comparison of Example 4a with Examples 1 and 2 demonstrates the synergistic effect of fillers on WVTR. The results also suggest that in order that a minimum WVTR of 30 g/m^2 per 24 hrs shall be achieved with a filled composition, the polymer itself should have a WVTR of 14 g/m^2 per 24 hrs at a mass per unit area of 45 g/m^2.

Example 5.

An 115 g/m^2 polyester/woodpulp nonwoven (Dexter grade 11877) was extrusion coated as in Example 2. Test data are included in Table 3 and compared with a typical prior-art vinyl coated product.

Table 3

	Example 5	Prior-art vinyl
Total grammage (g/m^2)	140	180
Fire rating	Class II	Class II
Smoke intensity	No smoke	8° max
WVTR (g/m^2 per 24 hrs)	30-70	25-55
Nicotine stain (%)	70	220
Dimensional stability (%)	0.07	0.78
Strippability (% release)	100	0
Elrepho opacity (%)	97	96

The overall superior performance of the example of the invention as a wall covering over that of the prior-art is clearly illustrated in the table.

It will, of course, be understood that the present invention has been described above purely by way of example and that modifications of detail can be made within the scope of the invention.

CLAIMS

1. A composite material comprising a substrate layer that is permeable to water vapour and a coating layer that is permeable to water vapour, characterised in that the coating layer comprises a plastics material, which plastics material is selected from olefin polymers, olefin copolymers, blends of olefin (co)polymers and mixtures of two or more of these, the said plastics material having particles of filler distributed therein.

2. A composite material according to claim 1, in which the substrate layer comprises a nonwoven material.

3. A composite material according to claim 2, in which the nonwoven material comprises cellulose fibres.

4. A composite material according to claim 3, in which the cellulose fibres are derived from hardwood pulp and softwood pulp.

5. A composite material according to claim 2, 3 or 4, in which the nonwoven material comprises synthetic fibres.

6. A composite material according to claim 5, in which the synthetic fibres are polyester fibres.

7. A composite material according to claim 5 or 6, in which the synthetic fibres have a fibre length of 5 to 20 mm and a linear density of 1 to 6 denier (9 to 54 tex).

8. A composite material according to any of claims 2 to 7, in which the nonwoven material is bonded with a resin binder.

9. A composite material according to claim 8, in which the resin binder is an acrylic or vinyl acetate resin.

10. A composite material according to any of claims 2 to 9, in which the nonwoven material comprises an opacity-increasing filler.

11. A composite material according to claim 10, in which the opacity-increasing filler is calcium carbonate.

12. A composite material according to any of claims 1 to 11, in which the substrate layer has a basis weight of from 30 to 200 g/m^2 and the coating layer has a basis weight of from 10 to 50g/m^2.

13. A composite material according to any of claims 1 to 12, in which the plastics material has a water vapour transmission rate of at least 14 g/m^2 24 h at 25°C/75% RH, measured on the unfilled plastics material at a mass per unit area of 45 g/m^2.

14. A composite material according to any of claims 1 to 13, which has a water vapour transmission rate of at least 30 g/m^2 24 h at 25°C/75% RH.

15. A composite material according to any of claims 1 to 14 in which the plastics material comprises a copolymer of an olefin and an alkyl acrylate or methacrylate.

16. A composite material according to claim 15, in which the plastics material comprises a copolymer of ethylene and butyl acrylate.

17. A composite material according to any of claims 1 to 16 in which the filler is present in the coating layer in an amount of up to 40% by weight of the filled plastics material in the coating layer.

18. A composite material according to any of claims 1 to 17, in which the filler in the plastics material is a mineral filler, e.g. calcium carbonate or a mixture of calcium carbonate or a mixture of calcium carbonate and titanium dioxide.

19. A composite material according to any of claims 1 to 18, in which the coating layer has a thickness in the range of from 10 to 50 μm and the substrate layer has a thickness in the range of from 80 to 500 μm.

20. A composite material according to any of claims 1 to 19 that is permeable to water vapour.

21. A process for the production of a composite material, which process comprises applying a coating formulation as a coating layer on a substrate layer, the coating layer and substrate layer being permeable to water vapour, wherein the coating formulation comprises a material that is selected from olefin polymers, olefin copolymers, blends of olefin (co)polymers and mixtures of two or more thereof and has particles of filler therein.

22. A process according to claim 21 for the production of a composite material according to any of claims 2 to 20.

23. A process according to claim 21 or 22, in which the coating is effected by extrusion coating.

24. The use as a wall covering of a composite material according to any of claims 1 to 20 or a composite material produced by the process of claim 21, 22 or 23.

25. A composite material according to any of claims 1 to 20 or produced by a process according to claim 21, 22 or 23, being a composite material for use as a wall cover material.

26. A method of covering an area of wall surface that comprises applying to said area of wall surface a composite material according to any of claims 1 to 20 or produced by a process according to claim 21, 22 or 23.

27. A coating formulation that comprises a plastics material that is selected from olefin polymers, olefin copolymers, blends of olefin (co)polymers and mixtures of two or more thereof and that has particles of filler therein.

28. A coating formulation according to claim 27, in which the plastics material is as defined in claim 15 or 16 and/or in which the amount of filler is as defined in claim 17 and/or in which the filler is as defined in claim 18.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/02832

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B32B27/12 B32B27/20 B32B5/32 B32B31/00 D06N3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B32B D06N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 29909 A (CLOPAY PLASTIC PROD CO) 21 August 1997 (1997-08-21) cited in the application page 7, line 2-18 -page 12, line 20; claims 1-6,8,10,11,13; figure 1; examples 1,2; table II page 14, line 15,16 -page 15, line 21	1-3,5,6, 12-15, 17,18, 20-23, 27,28
X	EP 0 734 321 A (KIMBERLY CLARK CO) 2 October 1996 (1996-10-02) page 3, line 53 page 5, line 53-55 -page 7, line 22; claims 1,3-6,15	1,2,5, 12-15, 17,18, 20-23, 27,28

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 August 2000	07/09/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Derz, T

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Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 187 005 A (STAHLE ARNO W ET AL) 16 February 1993 (1993-02-16)	1,2,5, 8-10,15, 21-28
Y	claims 1-5,11-18	7,17,18

X	DATABASE WPI Section Ch, Week 198107 Derwent Publications Ltd., London, GB; Class A32, AN 1981-10862D XP002125658 & JP 55 158961 A (UBE IND LTD), 10 December 1980 (1980-12-10)	1,2,5,6, 17
X	abstract	20-24
Y		3,4,6, 12-14, 16,22,23
X		27,28

X	DATABASE WPI Section Ch, Week 199326 Derwent Publications Ltd., London, GB; Class A13, AN 1993-208571 XP002125659 & JP 05 131536 A (SUMITOMO CHEM CO LTD), 28 May 1993 (1993-05-28) abstract	1,2,5, 17, 20-23, 27,28

X	US 4 878 974 A (KAGAWA SEIJI) 7 November 1989 (1989-11-07) claims 1-3,7-9	1,2,5, 21,27

Y	US 4 684 568 A (LOU GENE W) 4 August 1987 (1987-08-04) claims 1-4	1,2,5,7, 12-14, 21-23

Y	US 4 877 679 A (LEATHERMAN DENNIS D ET AL) 31 October 1989 (1989-10-31)	1-6, 16-18,21
X	column 2-4 -column 9-14; claims 1-9,25; example 35	27,28
A		7,12

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int ional Application No
PCT/GB 00/02832

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9729909 A	21-08-1997	US 5865926 A	02-02-1999
		AU 710947 B	30-09-1999
		AU 2263897 A	02-09-1997
		BR 9707449 A	20-07-1999
		CA 2244861 A	21-08-1997
		CN 1211213 A	17-03-1999
		CZ 9802449 A	12-05-1999
		EP 0934161 A	11-08-1999
		HU 9902044 A	29-11-1999
		JP 2000504644 T	18-04-2000
		NO 983670 A	14-10-1998
		NZ 331190 A	25-02-1999
		PL 328565 A	01-02-1999
EP 0734321 A	02-10-1996	AU 687967 B	05-03-1998
		AU 1335395 A	03-07-1995
		BR 9408329 A	19-08-1997
		DE 69417258 D	22-04-1999
		DE 69417258 T	08-07-1999
		JP 9506656 T	30-06-1997
		PL 315183 A	14-10-1996
		RU 2140855 C	10-11-1999
		CA 2116081 A	18-06-1995
		CN 1142798 A	12-02-1997
		EG 20760 A	31-01-2000
		ES 2131800 T	01-08-1999
		FR 2713983 A	23-06-1995
		FR 2717737 A	29-09-1995
		GB 2285408 A,B	12-07-1995
		WO 9516562 A	22-06-1995
		US 5855999 A	05-01-1999
		US 5695868 A	09-12-1997
		ZA 9410026 A	22-08-1995
US 5187005 A	16-02-1993	NONE	
JP 55158961 A	10-12-1980	JP 1253908 C	12-03-1985
		JP 59030545 B	27-07-1984
JP 5131536 A	28-05-1993	NONE	
US 4878974 A	07-11-1989	JP 1201340 A	14-08-1989
		JP 8032790 B	29-03-1996
		JP 2059331 A	28-02-1990
		JP 2574171 B	22-01-1997
		JP 2080231 A	20-03-1990
		JP 2597895 B	09-04-1997
		CA 1290235 A	08-10-1991
		EP 0327402 A	09-08-1989
US 4684568 A	04-08-1987	AU 586387 B	06-07-1989
		AU 7179887 A	22-10-1987
		CA 1255978 A	20-06-1989
		EP 0246748 A	25-11-1987
		JP 62256652 A	09-11-1987
		NO 871615 A	22-10-1987
US 4877679 A	31-10-1989	NONE	

(63)

are each permeable to water vapour. In certain embodiments no further layer is included; however, in other embodiments, any additional layer will generally also be permeable to water vapour.

The present invention, in another aspect, also provides a process for the production of a composite material, which process comprises applying a coating formulation as a coating layer on a substrate layer, the coating layer and substrate layer being permeable to water vapour, wherein the coating formulation comprises a plastics material that is selected from olefin polymers, olefin copolymers, blends of olefin (co)polymers and mixtures of two or more thereof and has particles of filler therein.

The present invention, in yet another aspect, also provides a coating formulation that comprises a plastics material that is selected from olefin polymers, olefin copolymers, blends of olefin (co)polymers and mixtures of two or more thereof and that has particles of filler therein. The coating formulation may, of course, contain one or more other components: in certain preferred embodiments, however, it consists essentially of the plastics material and the filler. The filler may be a single material or a mixture of different materials.

In further aspects, the present invention also provides the use of the said composite material as a wall covering. Thus, the invention provides the said composite material for use as a wall cover material and also provides a method of covering a wall surface that comprises applying to it a composite material of this invention.

Description of exemplary embodiments of the invention.

When the substrate of the composite is a nonwoven, it is preferably wetlaid. Nonwovens used as the substrates will generally comprise natural, in particular cellulose, fibres and/or synthetic fibres, the latter expression including fibres of organic polymers or copolymers such as polyesters. Thus, the nonwovens can comprise woodpulp fibres, preferably both softwood and hardwood pulp fibres, and short cut polyester fibres. Additionally a filler, especially calcium carbonate, is preferably incorporated in the web to provide high opacity. The nonwoven can be bonded with a resin binder formulation, especially an acrylic or vinyl acetate resin formulation. The fibre length and linear density of the polyester fibres should be chosen to give good web uniformity and will, typically, be in the range 5 to 20 mm and 1.0 to 6.0 denier (0.11 to 0.67 tex) respectively. The woodpulps should be chosen to provide a good combination of strength, opacity and

coating performance; their choice should preferably also recognise current environmental concerns.

4 = totally acceptable.

Curl: Measured in mm. deviation from a flat surface after making an X-cut with the arms of the X being 160 mm long and at 45° to the machine direction.

Pinholes: Bendtsen porosity measured according to ISO 8971-4 after the sample is treated at 150°C for one minute. If there is zero porosity "OK" is reported.

Water vapour transmission rate (WVTR), measured according to DIN 53122, expressed as g/m^2 per 24hrs at 25°C and 75% RH.

Opacity: Elrepho %, measured according to SCAN P-3: 75.

Fire rating and smoke intensity: SIS 02 48 23.

Nicotine stain: degree of yellowing when subject to tobacco smoke expressed as the % increase in the b value of the L a b colour measurements.

Dimensional stability: the % increase in length in the cross direction after 10 minutes of a 100 mm square sample pasted to a plaster board surface.

Strippability: the % of the sample remaining on a plaster board substrate after an attempt to pull the sample off 14 days after it had been pasted to the substrate.

Examples.

The invention is illustrated by means of the following examples, in which reference is made to the above test methods.

Example 1.

A 70 g/m^2 nonwoven substrate comprising a fibre blend of 40% 1.7 denier (1.19 tex), 15 mm precision cut polyester fibre and 60% woodpulp bonded with a vinyl acetate resin binder such that the total fibre content was 80% and the binder content was 20%, was extrusion coated with 40 g/m^2 of a polymer alloy comprising 70% ethylene n-butyl acrylate copolymer (EBA) (Borealis grade 6417), 25% calcium carbonate (particle size 2 - 5 microns) and 5% titanium dioxide (particle size 2 - 5 microns). For the extrusion, the melt temperature was in the range 280 - 300°C and the length to diameter ratio for the screw was greater than 26.The test data are shown in Table 1.

Example 2.

This example is the same as Example 1 except that the extrusion coating was 30 g/m^2. The test data are again shown in Table 1.

Example 3.

The same substrate as in Example 1 was extrusion coated with 40 g/m^2 of a polymer alloy comprising 60% EBA, 30% calcium carbonate and 10% titanium dioxide. This

CLAIMS

1. A composite material for use as a base in a wallcovering, which composite material comprises a substrate layer that is permeable to water vapour and a coating layer that is permeable to water vapour such that the composite material has a water vapour transmission rate of at least 30 g/m^2 24 h at 25°C/75% RH, characterised in that the coating layer comprises a plastics material, which plastics material consists essentially of a copolymer of an olefin and an alkyl acrylate or methacrylate or a mixture of two or more such copolymers, the said plastics material having particles of filler distributed therein, and in that the substrate layer comprises a nonwoven material that comprises cellulose fibres.

2. A composite material according to claim 1, in which the nonwoven material comprises woodpulp fibres.

3. A composite material according to claim 2, in which the cellulose fibres are derived from hardwood pulp and softwood pulp.

4. A composite material according to claim 1, 2 or 3, in which the nonwoven material also comprises synthetic fibres.

5. A composite material according to claim 4, in which the synthetic fibres are polyester fibres.

6. A composite material according to claim 4 or 5, in which the synthetic fibres have a fibre length of 5 to 20 mm and a linear density of 1 to 6 denier (0.11 to 0.67 tex).

7. A composite material according to any of claims 1 to 6, in which the nonwoven material is bonded with a resin binder.

8. A composite material according to claim 7, in which the resin binder is an acrylic or vinyl acetate resin.

9. A composite material according to any of claims 1 to 8, in which the nonwoven material comprises an opacity-increasing filler.

10. A composite material according to claim 9, in which the opacity-increasing filler is calcium carbonate.

11. A composite material according to any of claims 1 to 10, in which the substrate layer has a basis weight of from 30 to 200 g/m^2 and the coating layer has a basis weight of from 10 to 50g/m^2.

12. A composite material according to any of claims 1 to 11, in which the plastics material has a water vapour transmission rate of at least 14 g/m^2 24 h at 25°C/75% RH, measured on the unfilled plastics material at a mass per unit area of 45 g/m^2.

13. A composite material according to any of claims 1 to 12 in which the plastics material comprises a copolymer of a $C_2 - C_4$ olefin and a $C_1 - C_4$ alkyl acrylate or $C_1 - C_4$ alkyl methacrylate.

14. A composite material according to claim 13, in which the plastics material comprises a copolymer of ethylene and butyl acrylate.

15. A composite material according to any of claims 1 to 14 in which the filler is present in the coating layer in an amount of up to 40% by weight of the filled plastics material in the coating layer.

16. A composite material according to any of claims 1 to 15, in which the filler in the plastics material is a mineral filler, e.g. calcium carbonate or a mixture of calcium carbonate and titanium dioxide.

17. A composite material according to any of claims 1 to 16, in which the coating layer has a thickness in the range of from 10 to 50 μm and the substrate layer has a thickness in the range of from 80 to 500 μm.

18. A composite material according to any of claims 1 to 17, in which the coating layer is embossed and/or printed to provide a decorative effect.

19. A process for the production of a composite material that has a water vapour transmission rate of at least 30 g/m^2 24 h at 25°C/75% RH and is suitable for use as a base in a wallcovering, which process comprises applying a coating formulation as a coating layer on a substrate layer, the coating layer and substrate layer being permeable to water vapour, characterised in that the coating formulation comprises a plastics material that consists essentially of a copolymer of an olefin and an alkyl acrylate or methacrylate or a mixture of two or more such copolymers and has particles of filler therein, and in that the substrate layer comprises a nonwoven material that comprises cellulose fibres, and in that the composite material is not stretched by more than 3 per cent in the machine direction and is not stretched by more than 3 per cent in the cross direction.

20. A process according to claim 19 for the production of a composite material according to any of claims 2 to 17.

21. A process according to claim 19 or 20, in which the coating is effected by extrusion coating.

22. A process according to claim 19, 20 or 21 in which the composite material is not stretched by more than 2 per cent in the machine direction and is not stretched by more than 2 per cent in the cross direction.

23. A process according to claim 19, 20 or 21 in which the composite material is not stretched by more than 1 per cent in the machine direction and is not stretched by more than 1 per cent in the cross direction.

24. A process according to any of claims 19 to 23, in which the coating layer in the composite material is embossed and/or printed to provide a decorative effect.

25. The use as a wall covering of a composite material according to any of claims 1 to 18 or a composite material produced by the process according to any of claims 19 to 24.

26. A method of covering an area of wall surface that comprises applying to said area of wall surface a composite material according to any of claims 1 to 18 or produced by a process according to any of claims 19 to 24.

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